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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/805,914	03/15/2001	Roger Lee	M4065.0356/P356	2911

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EXAMINER

TOLEDO, FERNANDO L

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 08/01/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/805,914

Applicant(s)

LEE, ROGER

Examiner

Fernando Toledo

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-61 is/are pending in the application.
- 4a) Of the above claim(s) 43-61 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Claims 43 – 61 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 3.
2. Applicant's election without traverse of invention I, claims 1 – 42 in Paper No. 3 is acknowledged.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1 – 42 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In re claims 1 and 21 it is not clear what Applicant meant by "forming a plurality of first conductive layers *in* an insulating layer of a substrate." Are the conductive layers embedded into the insulating layer? Are the conductive layers sandwiched between two portions of the insulating layer?

Examiner assumes that Applicant meant forming the conductive layers in trenches formed in the insulating layer. If Applicant disagrees of this assumption, Applicant should address the concerns in the response to this Office Action.

In re claims 1 and 21, it is not clear what Applicant meant by "forming an insulating material in between and over said first and second magnetic layers." How can the insulating material be formed between the first and second magnetic layers if the second magnetic layer is formed before the insulating layer? Is the insulating material formed first between the two magnetic layers and then it is finished after the magnetic layer is formed? Does the insulating material diffuses through the second magnetic layer in order to reach a position between the two magnetic layers?

Examiner assumes that this insulating material is formed between the several second magnetic layers and on top of the second magnetic layers. If Applicant disagrees of this assumption, Applicant should address the concerns in the response to this Office Action.

In re claim 1, it is not clear what Applicant meant by "removing portion of said insulating material to expose at least one upper surface of a conductive layer, said conductive layer being part of said second magnetic layer." When was this conductive layer formed? Is the second magnetic layer the conductive layer?

Examiner assumes that the conductive layer is a separate layer from that of the second magnetic layer (i.e. a layer formed after the second magnetic layer is formed) and that it is formed prior to forming the insulating material. If Applicant disagrees of this assumption, Applicant should address the concerns in the response to this Office Action.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

4. Claims 1 – 42 are rejected under 35 U.S.C. 102(e) as being anticipated by Sandhu et al. (U. S. patent 6,358,756 B1).

In re claim 1, Sandhu, in the U. S. patent 6,358,756 B1; figures 1 – 7 and related text, discloses forming several of the first conductive layers in an insulating layer of a substrate (column 3); forming several of first magnetic layers over the respective first conductive layers (column 4); forming several of second magnetic layers spaced along the first magnetic layers (column 5); forming an insulating material in between and over the first and second magnetic layers (column 5); removing portion of the insulating material to expose at least one upper surface of a conductive layer, the conductive layer being part of the at second magnetic layer (column 5).

In re claim 2, Sandhu teaches wherein the act of removing portion of the insulating material further includes exposing several of upper surfaces of conductive layers respectively associated with the second magnetic layers (column 5).

In re claim 3, Sandhu shows further including forming nonmagnetic layers between the second magnetic layers and the first magnetic layers (column 4).

In re claim 4, Sandhu explains forming several of second conductors each in electrical connection with several of the exposed upper surfaces of the conductive layers, the several of second conductors running substantially orthogonal to the conductive layers (column 6).

In re claim 5, Sandhu further discloses wherein the act of removing a portion of the insulating material further includes chemical mechanical polishing (CMP) of the insulating material to expose the upper surface of the conductive layer (column 5).

In re claim 6, Sandhu further teaches wherein the conductive layer is formed of a material selected from the group consisting of tungsten nitrogen, tungsten gold, platinum or copper (column 3).

In re claim 7, Sandhu further explains wherein the insulating material is formed of a material selected from the group consisting of silicon nitride and oxides (column 3).

In re claim 8, Sandhu further shows wherein the insulating material is a high temperature polymer (column 3).

In re claim 9, Sandhu additionally discloses wherein the insulating material is a low dielectric constant inorganic material (column 3).

In re claim 10, Sandhu additionally shows wherein the insulating material is silicon nitride (column 3).

In re claim 11, Sandhu additionally teaches wherein the act of forming the first magnetic layers further includes the step of forming a first plurality of stacked layers, the first plurality of stacked layers including at least magnetic material layer (column 4).

In re claim 12, Sandhu additionally explains wherein the magnetic material layer contains a material selected from the group consisting of tantalum, nickel-iron, tungsten-nitrogen, nickel, cobalt-nickel-iron, iron and manganese-iron (column 4).

In re claim 13, Sandhu discloses wherein the first several of stacked layers includes layers of tantalum, nickel-iron and manganese-iron (column 4).

In re claim 14, Sandhu teaches etching the first several of stacked layers to have a width, which coincides with the width of the first conductive layers (column 4).

In re claim 15, Sandhu discloses wherein the act of forming the second magnetic layer further includes forming several second stacked layers, the several second stacked layers including at least one magnetic material layer and the conductive layer (column 5).

In re claim 16, Sandhu discloses wherein the magnetic material layer includes a material selected from the group consisting of tantalum, nickel-iron, tungsten-nitrogen, nickel, cobalt-nickel-iron and manganese-iron (column 5).

In re claim 17, Sandhu discloses wherein the several second stacked layers includes layers of tantalum, nickel-iron and tungsten nitrogen (column 5).

In re claim 18, Sandhu discloses further including etching the several second stacked layers (column 5).

In re claim 19, Sandhu discloses wherein the first magnetic layers have a pinned magnetic orientation (column 4).

In re claim 20, Sandhu discloses wherein the second magnetic layers have a free magnetic orientation (column 5).

In re claim 21, Sandhu discloses forming several of first conductive layers in an insulating layer formed over the semiconductor substrate (column 3); forming several of first magnetic layers over respective conductive layers (column 4); forming several of second magnetic layers spaced along the first magnetic layers, the several of second magnetic layers including respective top conductive layers (column 5); forming an insulating material over the substrate and the several of first and second magnetic layers including the top conductive layers, and in between adjacent first and second magnetic layers (column 5); removing portions of the insulating material from top conductive layers to expose several of upper surfaces of the top conductive layers associated with the second magnetic layers (column 5); forming several of second conductive layers over respective self aligned contacts, the second conductive layers running substantially orthogonal to the first magnetic layers; one of the first and second conductive layers being bit lines and the other of the first and second conductive layers being wordlines (column 6).

In re claim 22, Sandhu shows further including forming nonmagnetic layers between the second magnetic layers and the first magnetic layers (column 4).

In re claim 23, Sandhu discloses wherein the nonmagnetic layers are formed of the materials selected from the group consisting of aluminum oxide, titanium oxide, magnesium oxide, silicon dioxide and aluminum nitride (column 4).

In re claim 24, Sandhu discloses wherein the act of forming the insulating material further includes depositing the insulating material (column 5).

In re claim 25, Sandhu further discloses wherein the act of removing a portion of the insulating material further includes chemical mechanical polishing (CMP) of the insulating material to expose the upper surface of the conductive layer (column 5).

In re claim 26, Sandhu further teaches wherein the conductive layer is formed of a material selected from the group consisting of tungsten nitrogen, tungsten gold, platinum or copper (column 3).

In re claim 27, Sandhu teaches wherein at least one of the top conductive layers is formed of tungsten nitride (column 3).

In re claim 28, Sandhu teaches wherein at least one of the top conductive layers is formed of tungsten (column 3).

In re claim 29, Sandhu further explains wherein the insulating material is formed of a material selected from the group consisting of silicon nitride and oxides (column 3).

In re claim 30, Sandhu further shows wherein the insulating material is a high temperature polymer (column 3).

In re claim 31, Sandhu additionally discloses wherein the insulating material is a low dielectric constant inorganic material (column 3).

In re claim 32, Sandhu additionally shows wherein the insulating material is silicon nitride (column 3).

In re claim 33, Sandhu additionally teaches wherein the act of forming the first magnetic layers further includes the step of forming a first plurality of stacked layers, the first plurality of stacked layers including at least magnetic material layer (column 4).

In re claim 34, Sandhu additionally explains wherein the magnetic material layer contains a material selected from the group consisting of tantalum, nickel-iron, tungsten-nitrogen, nickel, cobalt-nickel-iron, iron and manganese-iron (column 4).

In re claim 35, Sandhu discloses wherein the first several of stacked layers includes layers of tantalum, nickel-iron and manganese-iron (column 4).

In re claim 36, Sandhu teaches etching the first several of stacked layers to have a width, which coincides with the width of the first conductive layers (column 4).

In re claim 37, Sandhu discloses wherein the act of forming the second magnetic layer further includes forming several second stacked layers, the several second stacked layers including at least one magnetic material layer and the conductive layer (column 5).

In re claim 38, Sandhu discloses wherein the magnetic material layer includes a material selected from the group consisting of tantalum, nickel-iron, tungsten-nitrogen, nickel, cobalt-nickel-iron and manganese-iron (column 5).

In re claim 39, Sandhu discloses wherein the several second stacked layers includes layers of tantalum, nickel-iron and tungsten nitrogen (column 5).

In re claim 40, Sandhu discloses further including etching the several second stacked layers (column 5).

In re claim 41, Sandhu discloses wherein the first magnetic layers have a pinned magnetic orientation (column 4).

In re claim 42, Sandhu discloses wherein the second magnetic layers have a free magnetic orientation (column 5).

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando Toledo whose telephone number is 703-305-0567. The examiner can normally be reached on Mon-Fri 8am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 703-308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7382 for regular communications and 703-308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Fernando Toledo
Examiner
Art Unit 2823

ft
July 26, 2002


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